

Oficina de IoT Conhecendo ESP8266

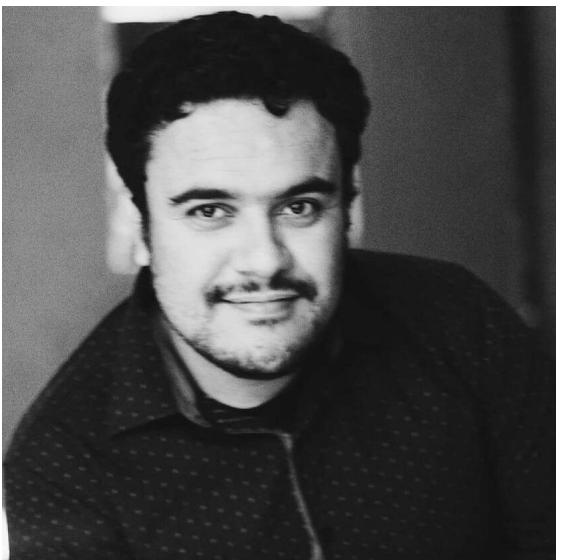


Em breve! Cursos online de IoT



cursosiotmakers.com.br

needinfo



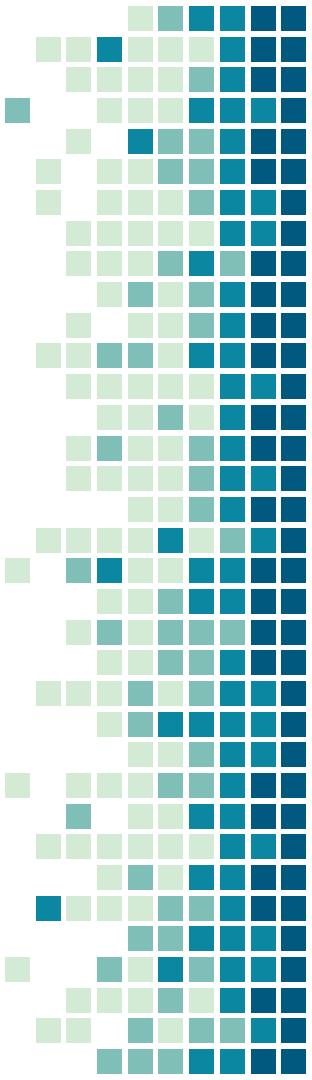
Sobre mim

Douglas Esteves

Engenheiro da Computação

Co-fundador do @IoT Makers

Membro do LHC Laboratório Hacker
de Campinas



IoT Makers

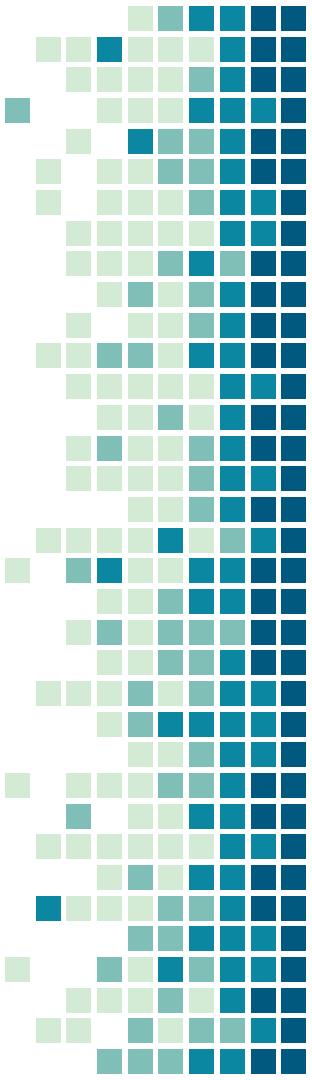




Sobre

Pablo Oliveira

Técnico em eletrônica
Desenvolvedor de Software na
CWI Software



Agenda

Internet das Coisas

Módulos ESP8266 / ESP32

Plataformas de desenvolvimentos

Comunidades

Ambientes para Oficina

Mão na massa

Referências



Internet das Coisas





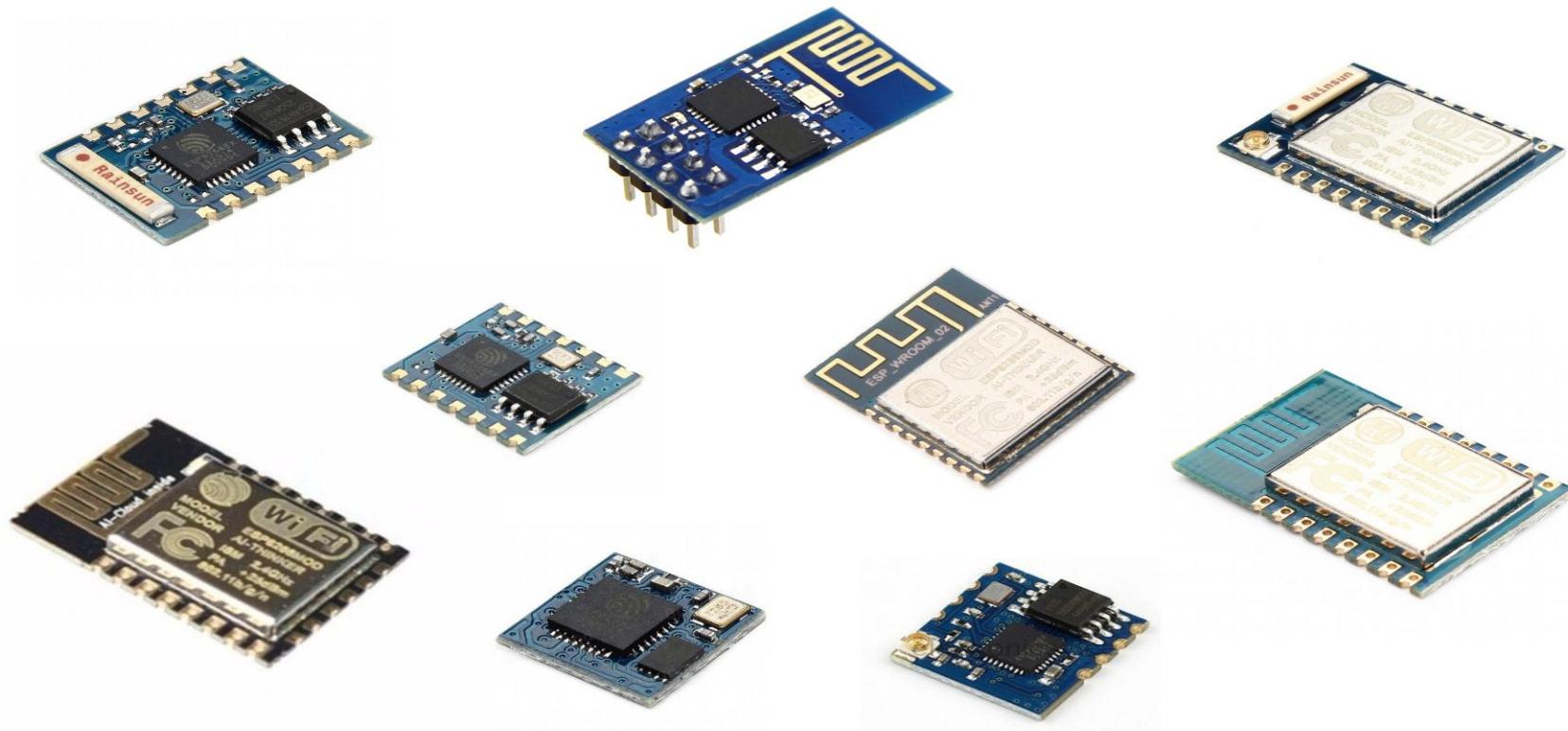
Imagen cnx-software.com

ESP8266

Hardware



Módulos com ESP8266



ESpecificações

Categories	Items	Parameters
Wi-Fi	Standard	CCC / FCC / CE / TELEC / SRRC
	Protocols	802.11 b/g/n
	Frequency Range	2.4 G ~ 2.5 G (2400 M ~ 2483.5 M)
	Tx power	802.11 b: + 20 dBm
		802.11 g: + 17 dBm
		802.11 n: + 14 dBm
	Rx Sensitivity	802.11 b: - 91 dbm (11 Mbps)
		802.11 g: - 75 dbm (54 Mbps)
		802.11 n: - 72 dbm (MCS7)
	Antenna	PCB on-board, external, IPEX connector, ceramic chip
Hardware	Peripheral interface	UART / SDIO / SPI / I2C / I2S / IR Remote Control GPIO / PWM
	Operating voltage	3.0 V ~ 3.6 V
	Operating current	Average: 80mA
	Operating temperature range	-40 °C ~ 125 °C
	Storage temperature range	-40 °C ~ 125 °C

ESpecificações

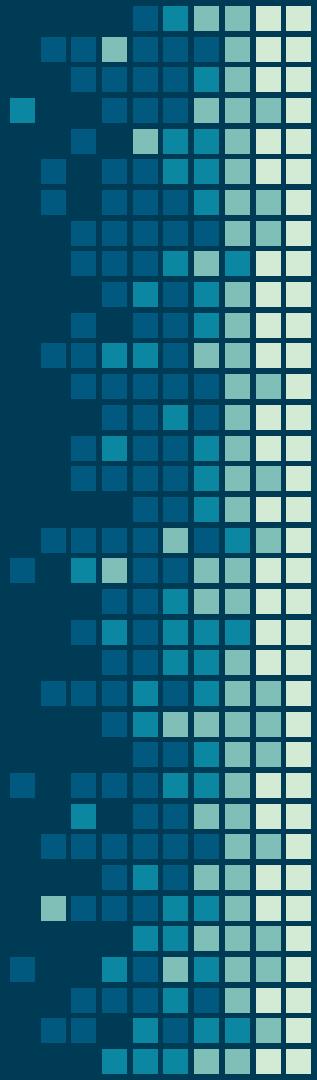
Categories	Items	Parameters
Software	Package size	QFN32-pin (5 mm x 5 mm)
	External interface	N/A
	Wi-Fi mode	station / softAP / SoftAP + station
	Security	WPA / WPA2
	Encryption	WEP / TKIP / AES
	Firmware upgrade	UART Download / OTA (via network)
	Software development	SDK for customised development / cloud server development
	Network Protocols	IPv4, TCP / UDP / HTTP / FTP
	User configuration	AT Instruction Set, Cloud Server, Android/ iOS App

Funcionalidades do ESP e Hardware

- O ESP é 3.3V. Em tensões maiores? Queima!
- O Mesmo se aplica as GPIOS e a Serial/UART
- O ESP consome, em picos, cerca de 250mA
- Ligar no máximo 12mA em cada GPIO
- Algumas GPIOs tem funções no boot!
- O ADC tem 10bits (0-1023 & 0-1V)
- Somente 4 PWMs

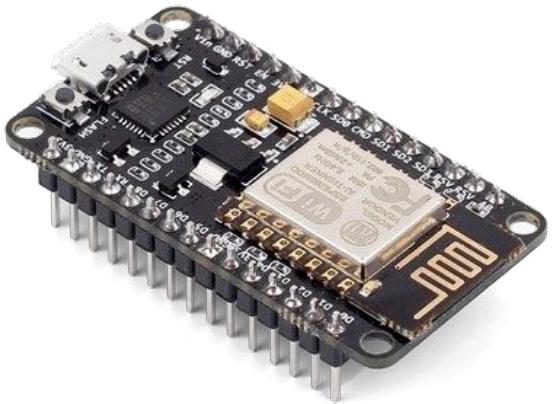
Placas de Desenvolvimentos

ESP8266



Programação com nodeMCU

- Programação em LUA script
- Curta curva de aprendizado
- Se faz um programa com poucas linhas de código
- http://nodemcu.com/index_en.html



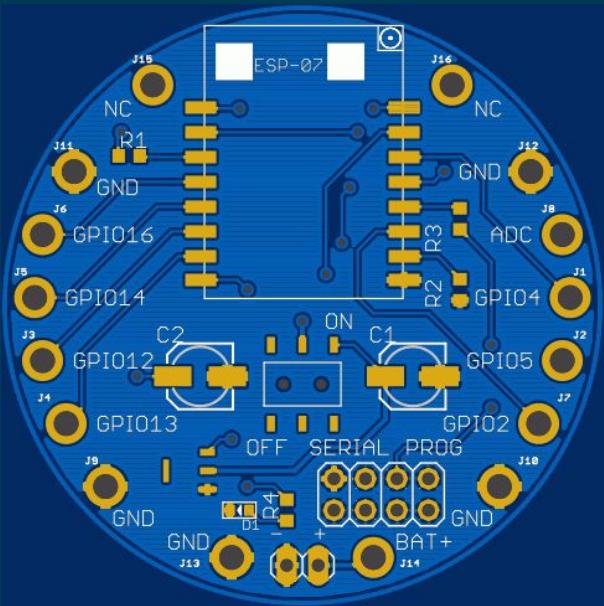
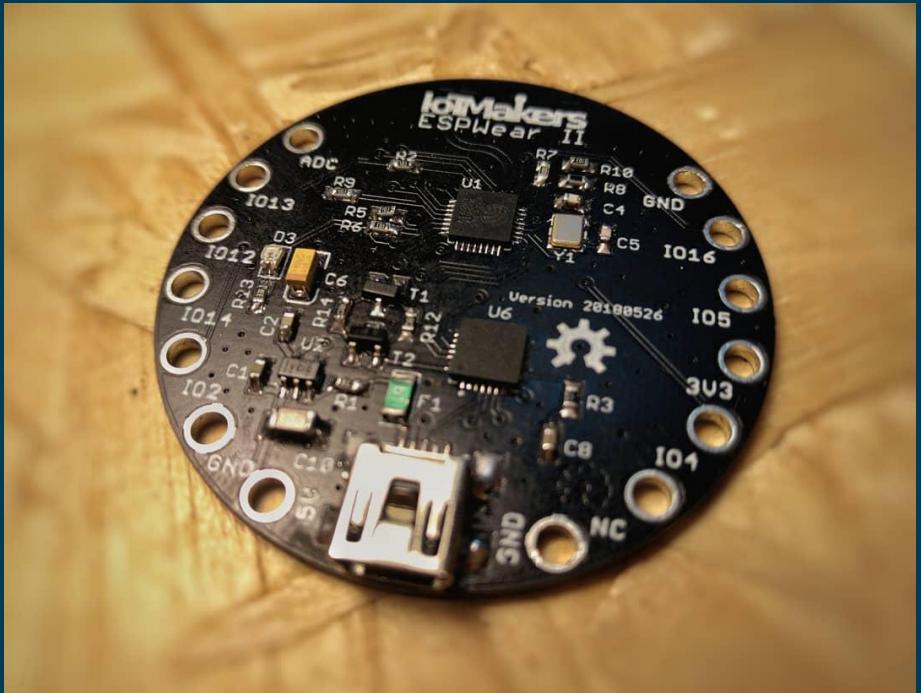
nodeLHC



<https://hackaday.io/project/7763-nodehc-esp8266-development-board>

<https://lhc.net.br/wiki/NodeLHC>

IoT Makers ESP Wear

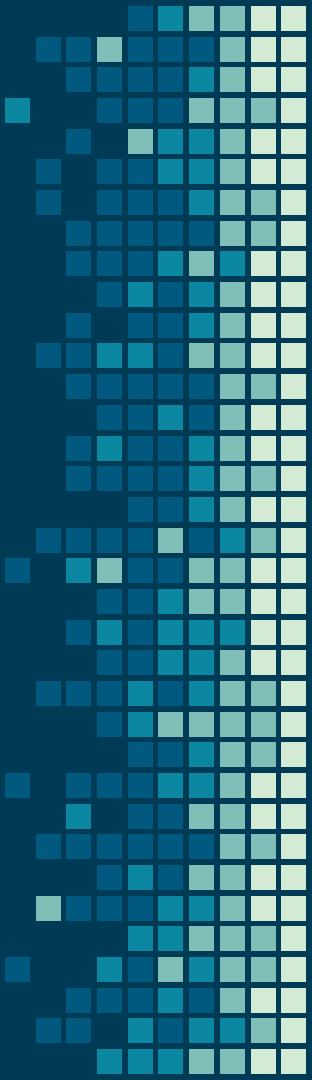


<https://hackaday.io/project/28790-espwear-esp8266-for-wearables>

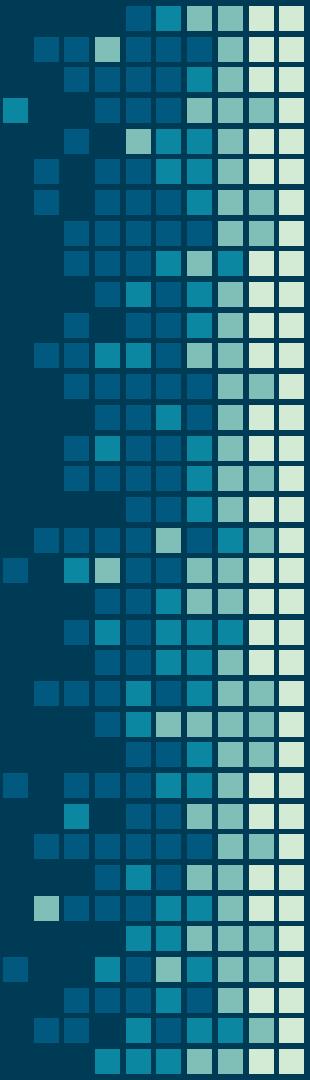
<http://iotmakers.com.br/esp8266/iot-for-wearables-espwear/>

Placas de Desenvolvimentos

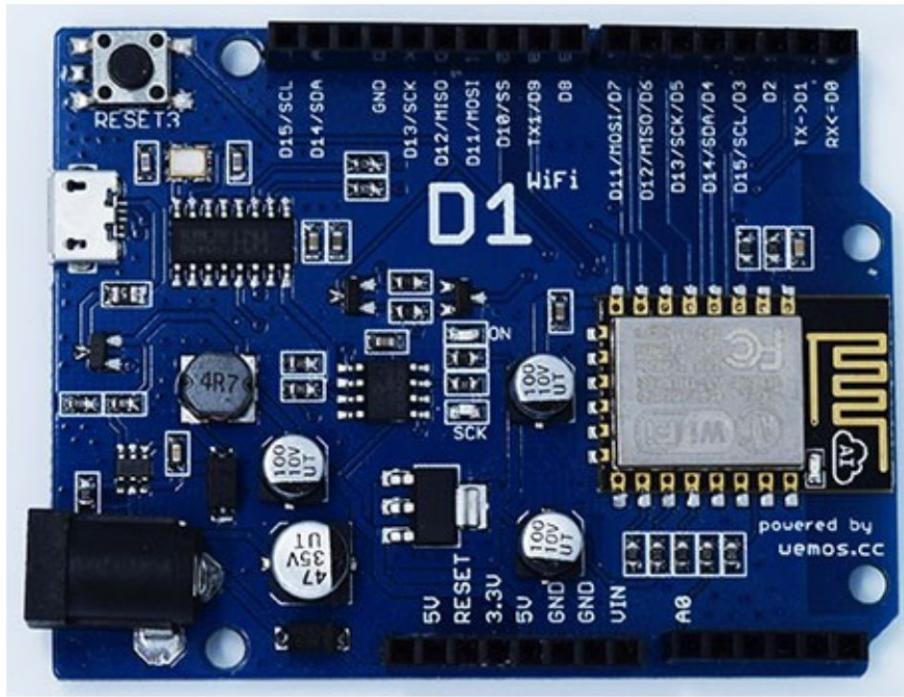
Muitas opções



Conhecendo a Wemos D1



WeMos D1 (primeira versão)

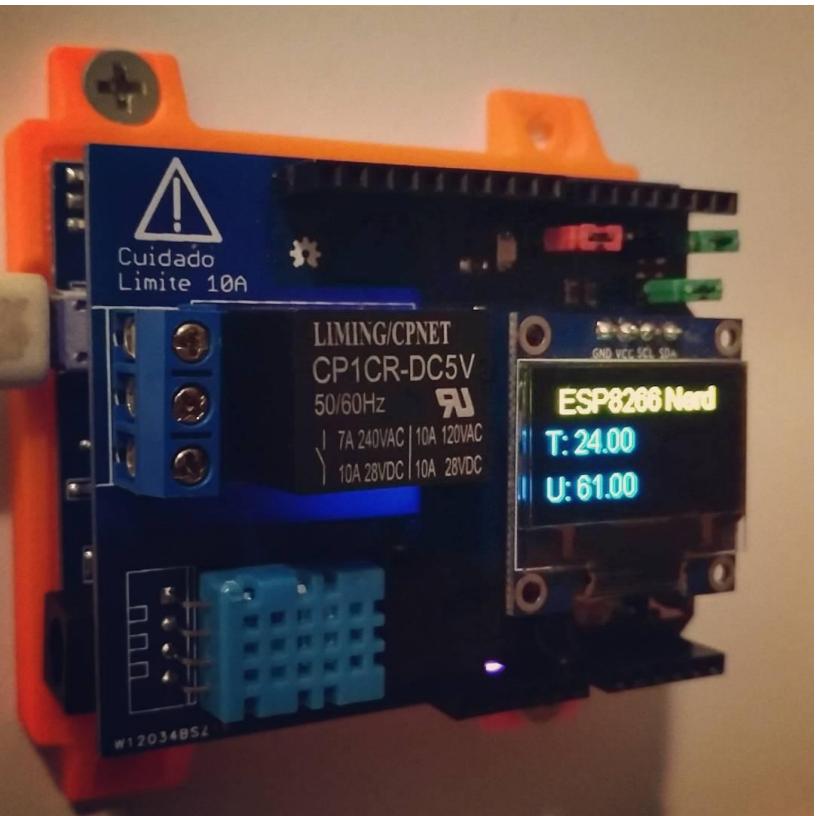


<http://pedrominatel.com.br/esp32/wemos-d1-o-esp8266-com-cara-de-arduino/>

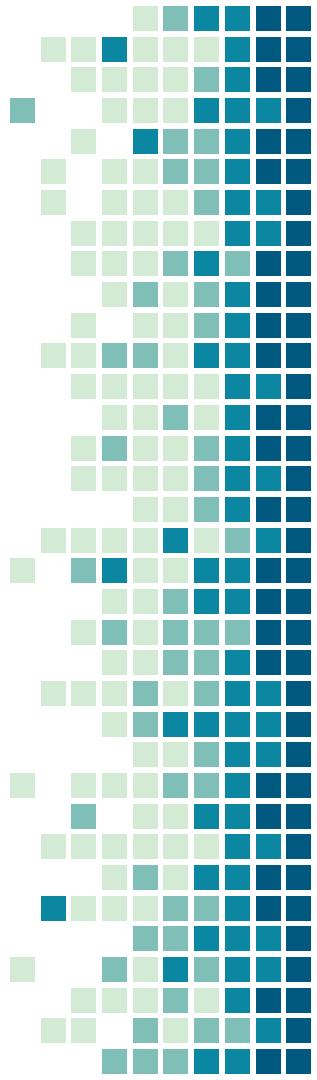
WeMos D1

- 11 Pinos de IO
- 1 ADC (max 3.2V)
- Micro USB (CH340)
- Entrada DC 9-24V
- ESP12
- 3V3
- 4MB Flash
- Clock 80/160MHz
- Formato Arduino

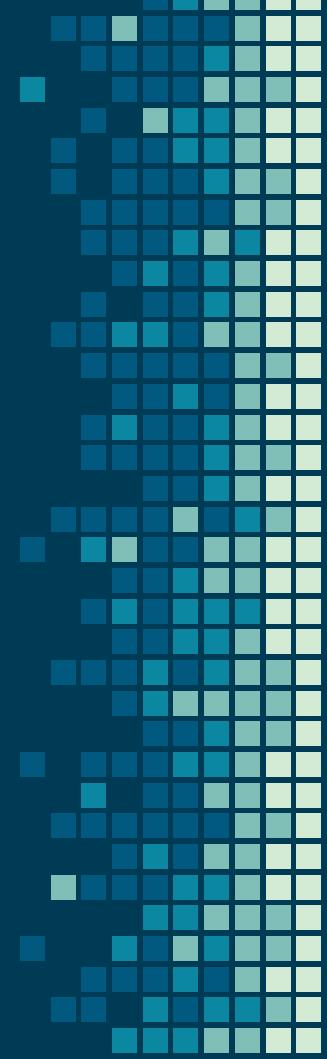
IoT Shield

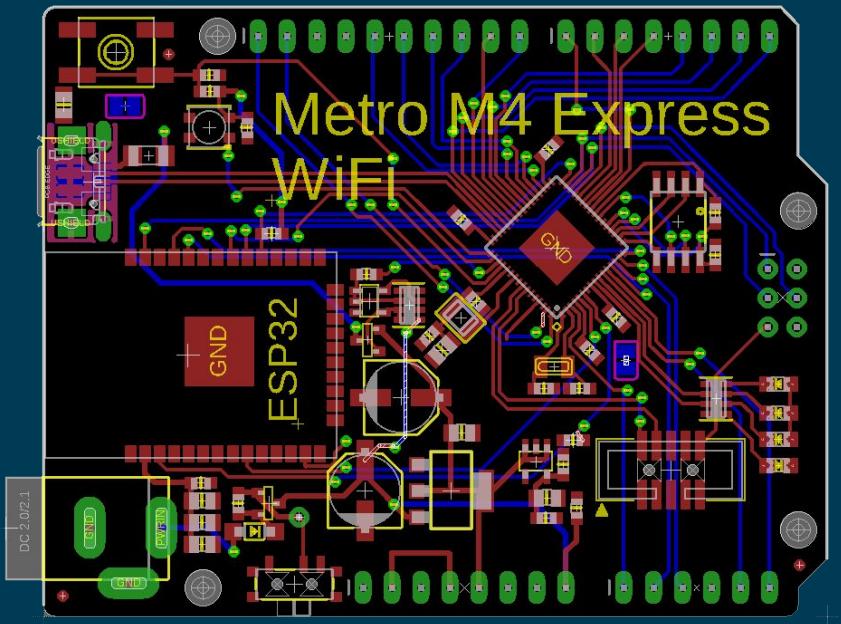


- Sensor de temperatura
- Sensor de umidade
- Rele (10Amps)
- LDR
- OLED Display
- Push button
- * LED RGB

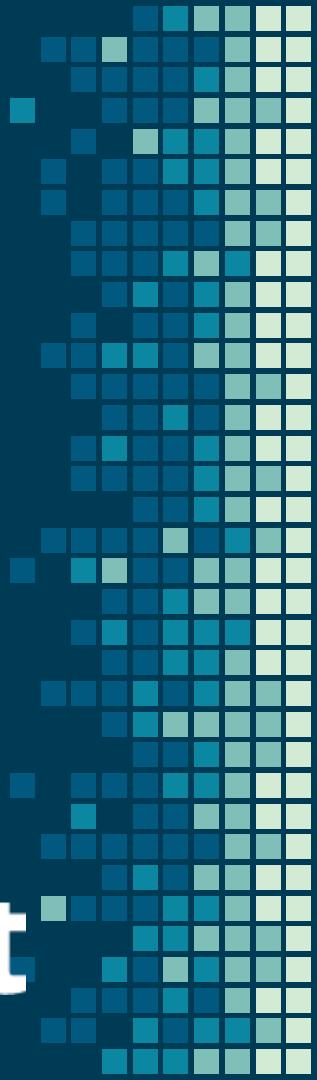


ESP32



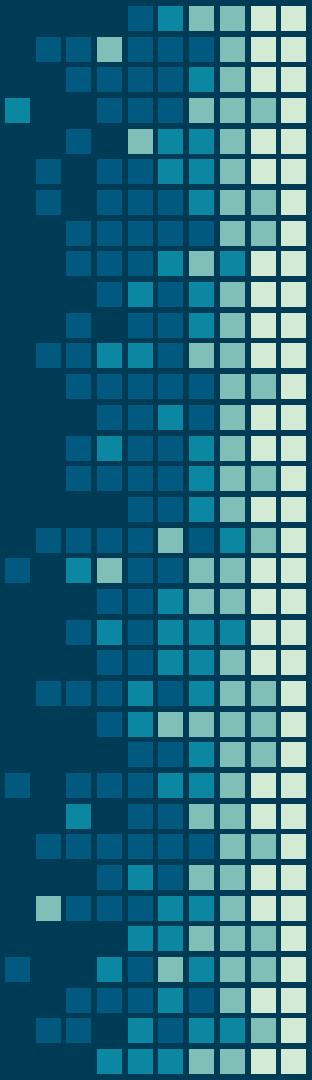


adafruit

The Adafruit logo consists of a stylized, five-petaled flower icon followed by the word "adafruit" in a lowercase, sans-serif font.

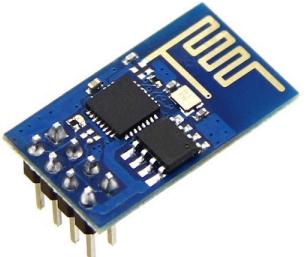


ESP32-D0WDQ6
392015
P6W255



Programação com Arduino IDE

- Programação similar ao Arduino
- Reuso de códigos já desenvolvidos no Arduino
- Reaproveitamento de conhecimento



Programação com Arduino IDE

- IDE 1.8.0 ou superior
 - Windows, Linux ou MAC
- Pacote ESP8266
 - Versão 2.3.0
 - http://arduino.esp8266.com/stable/package_esp8266com_index.json
 - <http://pedrominatel.com.br/pt/arduino/como-utilizar-o-esp8266-com-a-ide-arduino-instalando-o-modulo/>
- Drive CH340 para alguns casos no windows
- GNU/LINUX
 - Manjaro, Ubuntu, Debian, Mint, ElementaryOS...

PlatformIO



PlatformIO is an open source ecosystem for IoT development

Cross-platform IDE and unified debugger. Remote unit testing and
firmware updates

[Development Platforms](#)

[Frameworks](#)

[Embedded Boards](#)

[Project Examples](#)

[Libraries](#)

[Library Examples](#)

Professional development environment for

ARMmbed

Atmel

ESPRESSIF SYSTEMS

intel

freescale

LATTICE SEMICONDUCTOR

MICROCHIP

NORDIC SEMICONDUCTOR

NXP

SILICON LABS

ST life.augmented

Teensy

TEXAS INSTRUMENTS

ARDUINO

Energía

libOpenCM3



PlatformIO IDE 0.12.1
Official PlatformIO IDE...
Plat... Reload Install

IntelliJ IDEA K... 0.2.20
Port of IntelliJ IDEA K...
Keisuke Kato Install

PlatformIO 0.2.3
PlatformIO for Visual ...
Jun Han Install

vscode-flow-ide 1.2.0
Visual studio code Flo...
gcazaciu Install

OCaml and Rea... 1.0.24
OCaml and Reason la...
Darin Morrison Install

Polymer IDE 0.6.0
Provides linting, autoc...
polymer Install

JetBrains IDE K... 0.1.3
JetBrains IDE Keymap...
isodox Install

PureScript IDE 0.14.0
PureScript IntelliSens...
Nicholas Wolv... Install

Crystal IDE 0.0.4
Syntax and error chec...
Ryan L. Bell Install

Java IDE Pack 0.1.1
All Java extensions to...
Paul Verest Install

fish-ide 0.3.1
IDE features for fish s...
Sebastian Wie... Install

PocketMine IDE 0.0.6

PlatformIO IDE

PlatformIO.Org | ↗ 116,790 | ★★★★★ | Repository | License

Official PlatformIO IDE for IoT, Arduino, ARM mbed, Espressif (ESP8266/ESP32), STM32, PIC32, nRF51/nRF52, FPGA, CMSIS, SPL, ...

Reload Install

Details Contributions Changelog Dependencies

PlatformIO IDE for VSCode

VS Marketplace v0.12.1 installs 116.79K rating 4.13/5 (15)

The next generation Integrated development environment for IoT

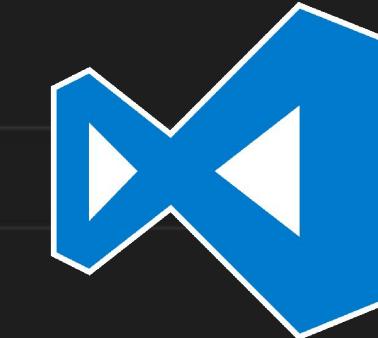
PlatformIO is an open source ecosystem for IoT development. Cross-platform build system and unified debugger. Remote unit testing and firmware updates.

Platforms: Atmel AVR, Atmel SAM, Espressif 32, Espressif 8266, Freescale Kinetis, Intel ARC32, Lattice ICE40, Maxim 32, Microchip PIC32, Nordic nRF51, Nordic nRF52, NXP LPC, Silicon Labs EFM32, ST STM32, Teensy, TI MSP430, TI Tiva, WIZNet W7500

Frameworks: Arduino, ARTIK SDK, CMSIS, Energia, ESP-IDF, libOpenCM3, mbed, Pumbaa, Simba, SPL, STM32Cube, WiringPi

Features

- Cross-platform code builder without external dependencies to a system software:
 - 450+ embedded boards
 - 20+ development platforms
 - 10+ frameworks
- PIO Remote™
- PIO Unified Debugger
- Unit Testing
- C/C++ Intelligent Code Completion



28

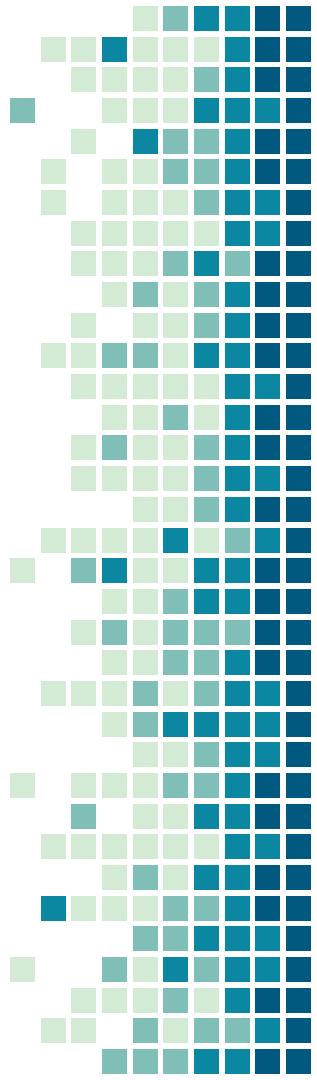
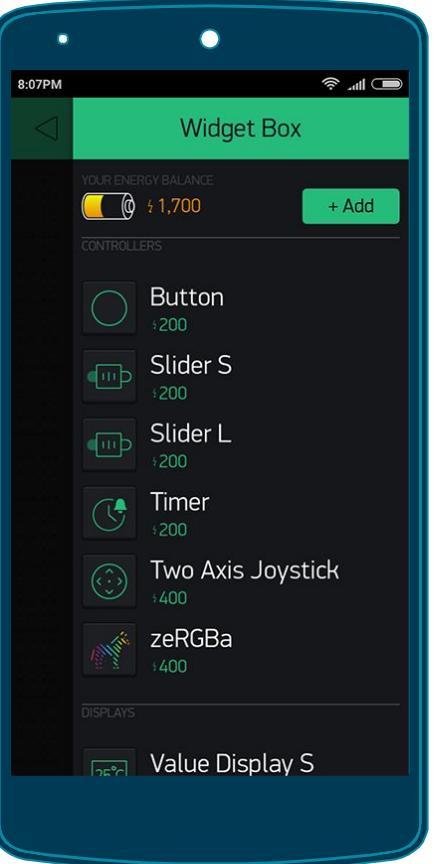


Blynk
Mobile

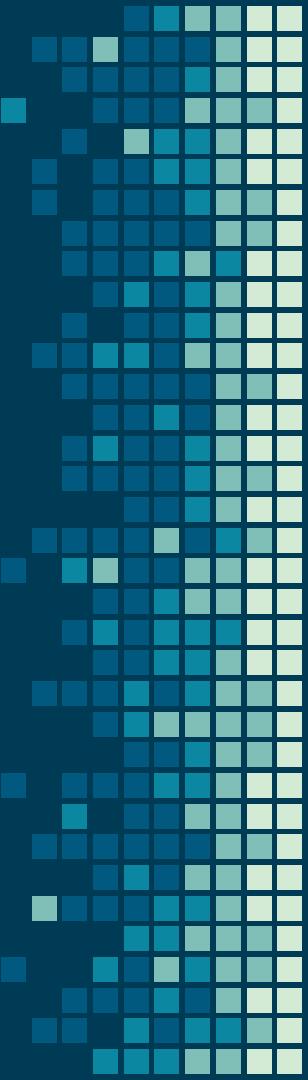
- Desenvolvimento direto do APP
- Código inicial usando o internet do Arduino
- Rede Local
- Token
- Recursos visuais



Blynk App



Plataformas



TagoIO

TagoIO | Developer

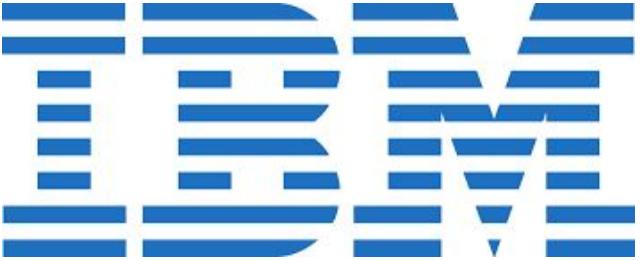
Home Devices Buckets Files Analysis Actions Explore Dashboards Chicago - Bus LHC-Temperatura

Devices

Devices are the link between your external things and the data buckets in your account. [Read more here.](#)

Name	Last Input	Last Output	Active	Bucket linked	Created at
wemos	N/A	N/A	Yes	wemos	2 months ago

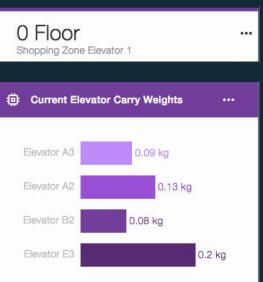
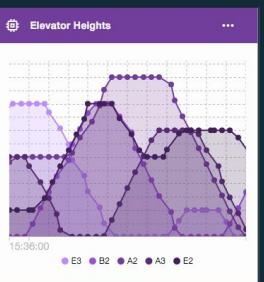
Device Emulator + Add Device



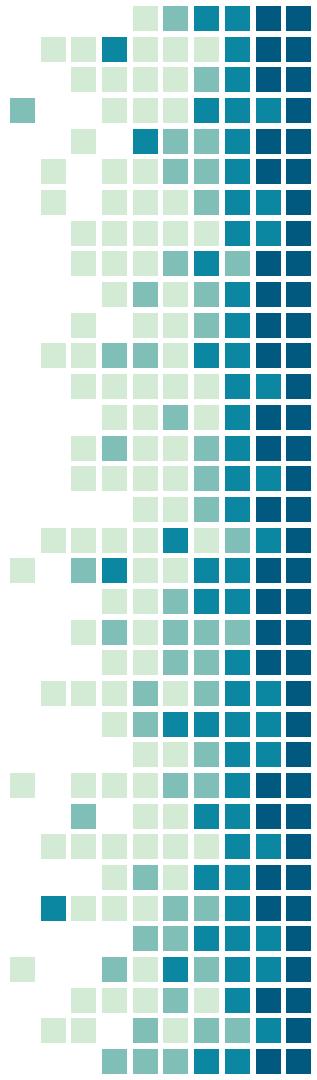
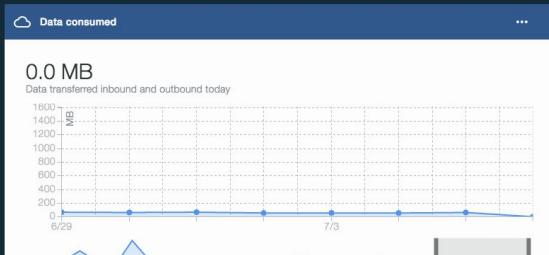
Device Status Board

[+ Add New Card](#) [Settings](#)

- 1 Floor Shopping Zone Elevator 2
- 0 Floor East Corridor Elevator
- 3 Floor Emergency/Freight Elevator
- 0 Floor North Walkway Elevator



Data Status





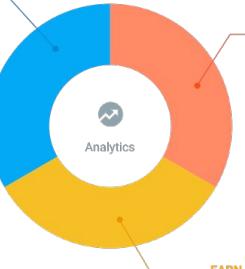
Google Cloud



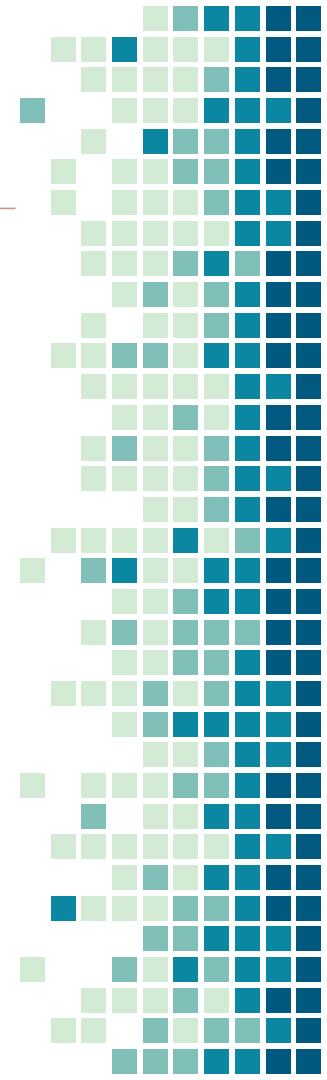
 Google Analytics for Firebase

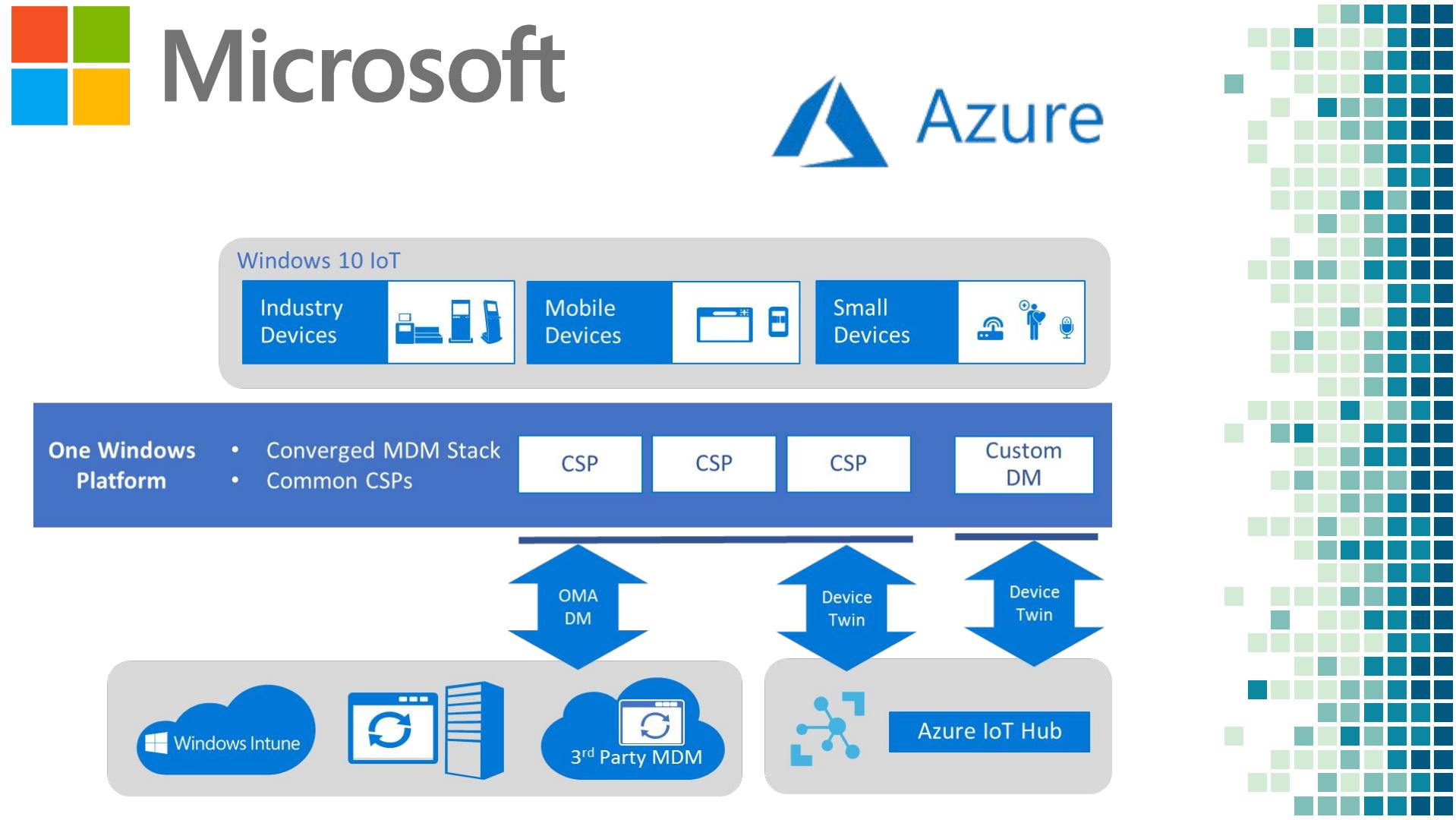
DEVELOP

-  Realtime Database
-  Authentication
-  Cloud Messaging
-  Storage
-  Hosting
-  Remote Config
-  Test Lab
-  Crash Reporting

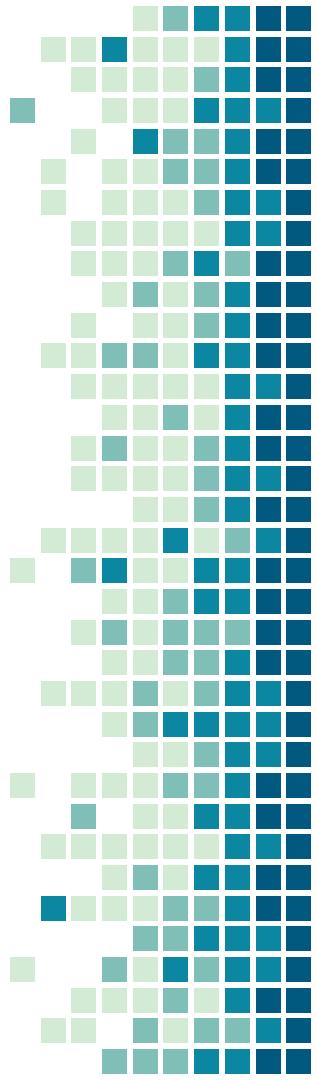
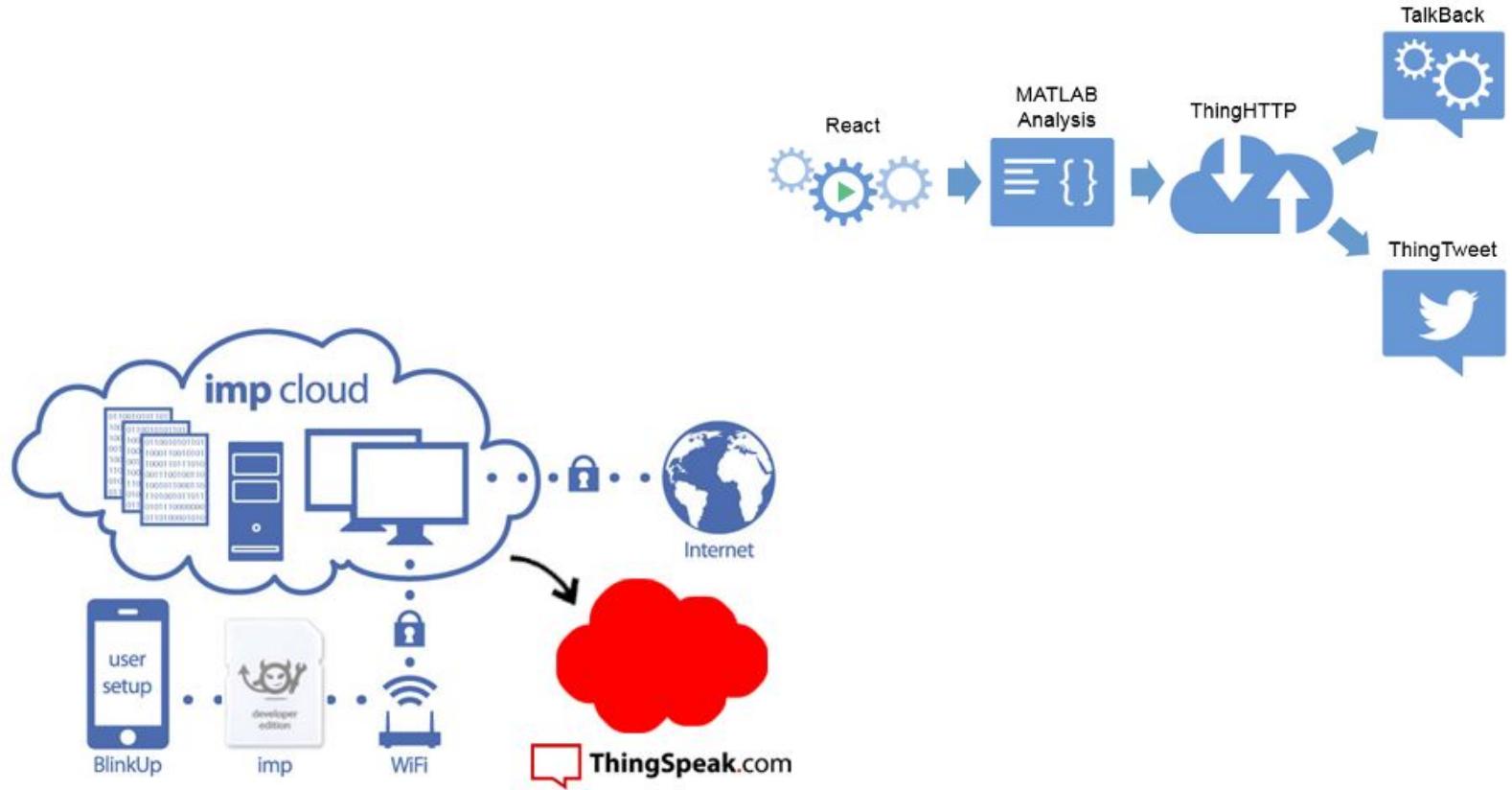


-  Notifications
-  App Indexing
-  Dynamic Links
-  Invites
-  AdWords





ThingSpeak



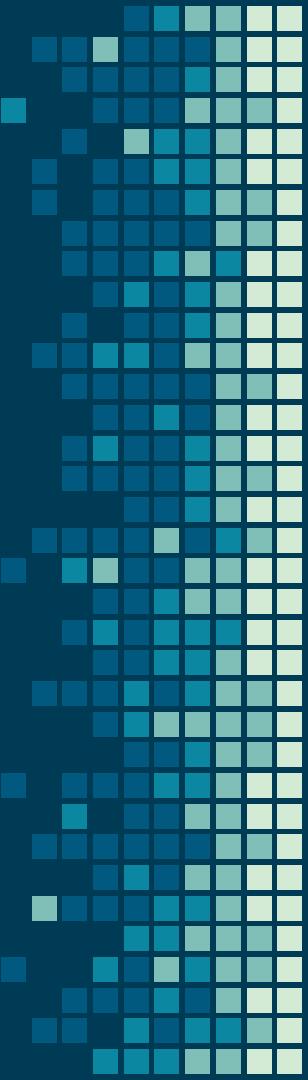
O que é um GPIO ?

"General Purpose Input/Output (GPIO) são portas programáveis de entrada e saída de dados que são utilizadas para prover uma interface entre os periféricos e os microcontroladores/microprocessadores".

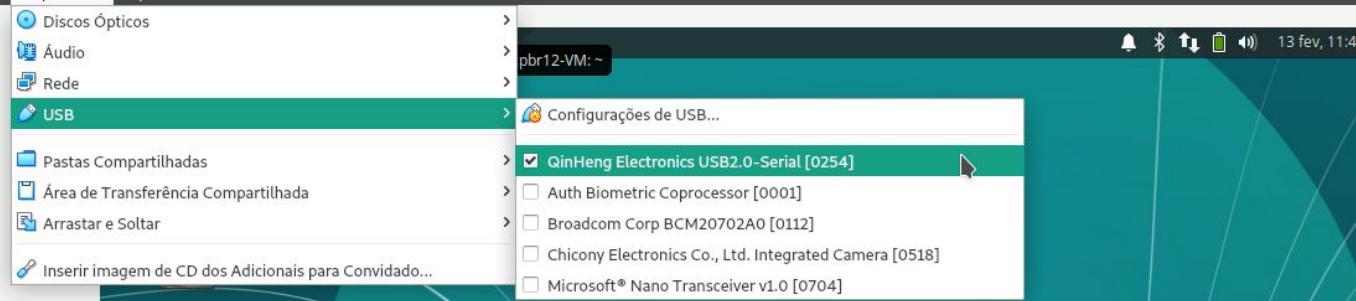
Máquina Virtual

<https://www.virtualbox.org/>

Baixar a VM com a Oficina de IoT
Quem utiliza linux : user o comando
\$ usermod -a -G vboxusers \$USER



o Máquina Visualizar Dispositivos Ajuda



main.cpp - Untitled (Workspace) Terminal - cpbr12@cpbr12...

File Edit Selection View Go Debug Terminal Help main.cpp - Untitled (Workspace) - Visual Studio Code

EXPLORER main.cpp CPBR12-01-WiFi-Scan • src main.cpp CPBR12-04-tagoio • src PIO Home

OPEN EDITORS main.cpp CPBR12-01-WiFi-Scan • src main.cpp CPBR12-04-tagoio • src PIO Home

UNTITLED (WORKSPACE) main.cpp test .gitignore .travis.yml platformio.ini CPBR12-02-softap CPBR12-03-webserver CPBR12-04-tagoio .pioenvs .vscode include lib src main.cpp

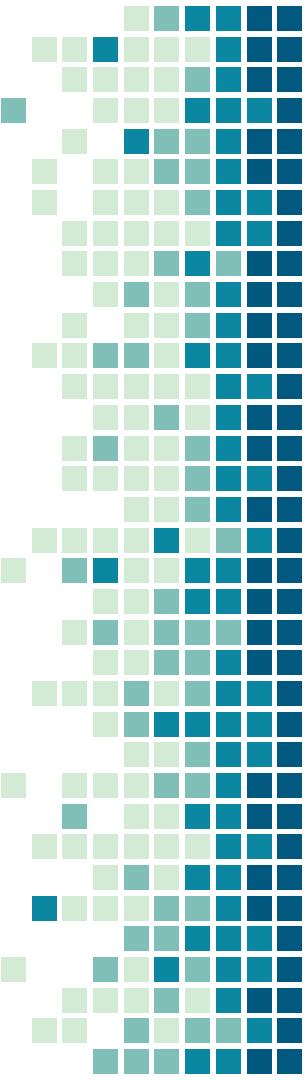
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL 2: Task - PlatformIO: M + - ^ ×

```
1 /* Pedro Minatel - Sistemas Embarcados
2 * Data: 16 de Setembro de 2015
3 * Author: Pedro Minatel
4 * Website: http://pedrominate.com.br
5 */
6
7 //Include da lib de Wifi do ESP8266
8 #include <ESP8266WiFi.h>
9
10 //Definir o SSID da rede WiFi
11 const char* ssid = "<<<YOUR_SSID>>>";
12 //Definir a senha da rede WiFi
13 const char* password = "<<<YOUR_PASSWORD>>>";
14
15 //Colocar a API Key para escrita neste campo
16 //Ela é fornecida no canal que foi criado na aba API Keys
17 String apiKey = "<<<YOUR_TAGO_KEY>>>";
18 const char* server = "api.tago.io";
19
20 int time_esp = 0;
21
22 WiFiClient client;
```

--- Miniterm on /dev/ttyUSB0 9600,8,N,1 ---
--- Quit: Ctrl+C | Menu: Ctrl+T | Help: Ctrl+T followed by Ctrl+H ---

Filter loop() setup() envia_dados(v...) server

(Global Scope) Ln 11, Col 33 (9 selected) Spaces: 2 UTF-8 LF C++ Linux



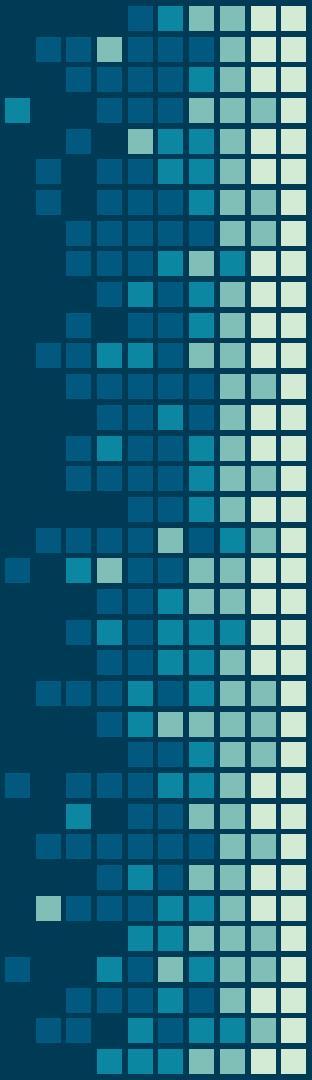
GitHub

<https://github.com/IoTMakers/cpbr12/>

Exercício - blink

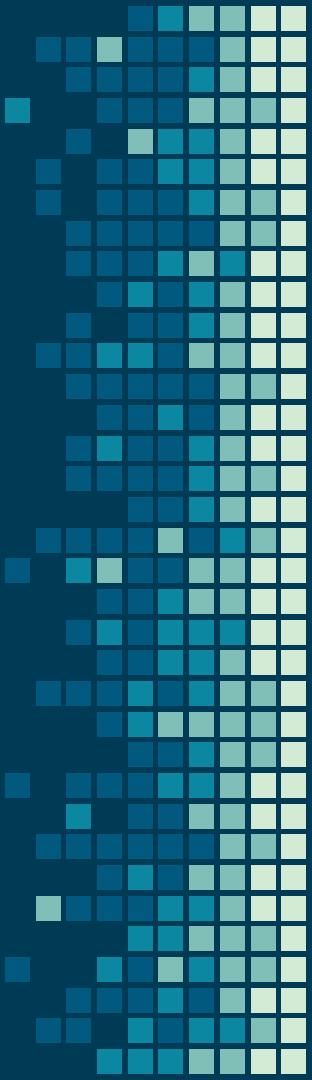
Implementar um blink (hello world) utilizando o LED

Tempo: 5 minutos.



blink.ino

```
void setup(void) {  
    //Configura o pino digital para saida/output  
    pinMode(5, OUTPUT);  
    digitalWrite(5, LOW);  
}  
  
void loop(void) {  
    //envia o comando de escrita no pino digital  
    digitalWrite(5, HIGH);  
    //funcao de pausa/delay em mili-segundos  
    delay(1000);  
    digitalWrite(5, LOW);  
    delay(1000);  
}
```



01-wifi-scan.ino

Scaneamento de SSID.

02-softap.ino

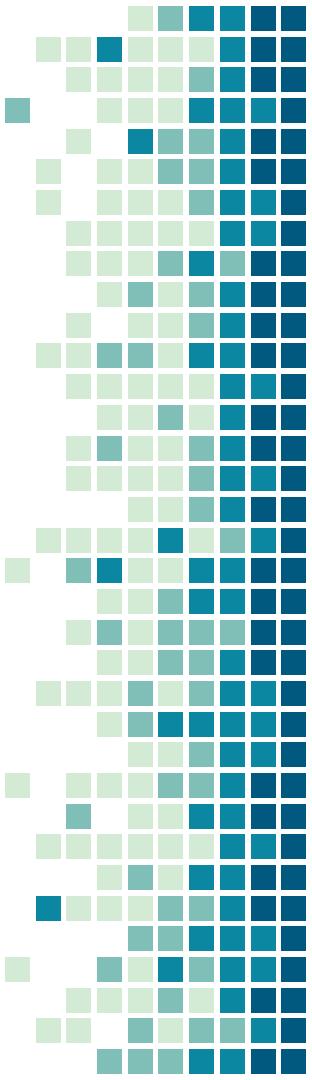
Monte seu AP

03-webserver.ino

Webserver de um ESP8266

04-tagoio.ino

Conectando em uma plataforma



Referências

github

github.com/iotmakers

Hackerspace LHC

www.lhc.net.br

Pedro Minatel Blog

www.pedrominatel.com.br

Portal Embarcados

www.embarcados.com.br

Grupos makers

<https://t.co/sUjdiltWBI>



Em breve! Cursos online de IoT



cursosiotmakers.com.br

needinfo

Muito Obrigado

Contatos !



19 98230-3616



@_EstevesDouglas



douglas@iotmakers.com.br